Claims:

1. A magnetic focusing lens apparatus for focusing multiple substantially parallel charged particle beams, comprising: a coil energized by an adjustable DC electric current to generate a DC magnetic field; and a plurality of magnetic pole pieces excited by the electric current, each of the plurality of magnetic pole pieces being disposed to focus one of the multiple substantially parallel charged particle beams approximately in a plane orthogonal to a direction of propagation of the multiple substantially charged particle beams.

2. The magnetic lens focussing apparatus of claim 1, wherein the beams are electron beams.

3. The magnetic lens focussing apparatus of claim 1, wherein the plurality of magnetic pole pieces are arranged in an n by m array.

4. The magnetic lens focussing apparatus of claim 3, wherein the plurality of magnetic pole pieces are arranged with substantially equal spacing between the magnetic pole pieces.

5. The magnetic lens focussing apparatus of claim 1, wherein n is 2 to 20.

6. The magnetic focusing lens apparatus of claim 1, wherein each of the plurality of magnetic pole pieces substantially similar lens characteristics.

7. The magnetic focusing lens apparatus of claim 5, further comprising additional magnetic pole pieces, thereby providing substantially similar lens characteristics for each of the plurality of magnetic pole pieces.

8. The magnetic focusing lens apparatus of claim 3, further comprising additional magnetic pole pieces arranged around the periphery of the n by m array.

9. The magnetic focusing lens apparatus of claim 1, wherein each plurality of magnetic pole pieces has an associated focus adjustment.

10. The magnetic focusing lens apparatus of claim 9, wherein the focus adjustment is a magnetic coil energized with a controllable current for each of the beams and the focus adjustment provides a field of less strength than that of the magnetic coil.

11. The magnetic focusing lens apparatus of claim 9, wherein the focus adjustment is an electrostatic element energized with a controllable voltage for each of the beams.

12. The magnetic focusing lens apparatus of claim 9, wherein the focus adjustment focuses the beams in the plane orthogonal to a direction of propagation of the beams.

13. The magnetic focusing lens apparatus of claim 9, wherein the focus adjustment individually focuses the beams at a surface of a workpiece in the plane orthogonal to a direction of propagation of the beams, thereby to correct for changes in a position of the workpiece.

14. A lens apparatus for focusing multiple charged particle beams, comprising: a circuit controlled with an adjustable voltage or electric current to generate an adjustable focusing field; and a plurality of lens elements energized by the circuit where each of the plurality of lens elements is disposed to focus one of the multiple charged particle beams.

15. An electrostatic focusing lens apparatus for focusing multiple substantially charged particle beams, comprising: an electrostatic electrode energized by an adjustable voltage to generate a plurality of electrostatic lens fields; and wherein the electrostatic electrode comprises a plurality of electrostatic lens elements energized by the adjustable voltage where each of the plurality of electrostatic lens elements is disposed to focus one of the multiple substantially parallel charged particle beams approximately in a plane orthogonal to a direction of propagation of the multiple substantially parallel charged particle beams.

16. A multi-source charged particle gun apparatus for generating a plurality of substantially parallel charged particle beams, comprising: a plurality of charged particle sources, each of the plurality of charged particle sources provided with at least one electrode energized by an adjustable voltage to extract a plurality of substantially parallel charged particle beams, one beam being from each of the plurality of charged particle sources; a magnetic coil energized by an adjustable electric current to generate a magnetic field; and a plurality of magnetic pole pieces excited by the electric current and disposed to control the focus of each of the multiple substantially parallel charged particle beams.

17. The apparatus of claim 16, wherein the plurality of charged particle sources are each a TFE electron source.

18. The apparatus of claim 16, further comprising a stage for holding a workpiece onto which the beams are directed, the stage being selected from a group consisting of a stepping stage and a scanning stage.

19. A charged particle multi-beam column apparatus for imaging with a plurality of substantially parallel focused charged particle beams, comprising: a plurality of charged particle sources, each of the plurality of charged particle sources being provided with at least one electrode energized by an adjustable voltage to extract a plurality of substantially parallel charged particle beams, one beam being from each of the plurality of charged particle sources; a magnetic coil energized by an adjustable electric current to generate a magnetic field; and a plurality of magnetic pole pieces excited by the electric current and disposed to focus the multiple substantially parallel charged particle beams approximately in a plane orthogonal to a direction of propagation of the multiple substantially parallel charged particle beams.

20. The apparatus of claim 19, further comprising a plurality of detectors, one detector associated with each of the multiple substantially parallel charged particle beams.

21. The apparatus of claim 19, wherein the charged particle sources are each a TFE electron source.

22. The apparatus of claim 19, wherein the plurality of detectors are each a semiconductor diode.

23. A multi-beam inspection system comprising: a stage for supporting a workpiece subject to inspection and mounted in a chamber; a multi-beam charged particle column that generates a plurality of substantially parallel charged particle beams, each of the plurality of charged particle beams being incident on portions of the workpiece thereby to produce a plurality of streams of image data; and am image processor coupled to process the plurality of image data streams, thereby to detect defects in the workpiece.

24. The multi-beam inspection system of claim 23, wherein the stage is selected from a group consisting of a stepping stage and a scanning stage.

25. The multi-beam inspection system of claim 23, wherein the stage has a travel in an X and Y axis approximately equal to the size of the workpiece plus the farthest distance between rows of charged particle beams from the multi-beam column in a direction parallel to an axis of the stage's movement.

26. The multi-beam inspection system of claim 23, wherein the beam columns are spaced apart, thereby to reduce a required travel of the stage by at least one-third.